

CREDITS

The model is co-financed by the DICEA-UNIFI among the projects for teaching innovation and orientation.

The activities are also carried out within the Gruppo Alluvioni GRAL - Education. The poster for the model is among the highlights of the "Games for Geoscience" session of EGU 2018.

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Coping with flood scenarios through LEGO bricks



risk awareness

The **awareness** of the population to the **risk perception** is an issue of growing importance in the **mitigation of natural hazards**.

During a natural event, awareness of the dangers and self-protection behaviors, can mitigate risk situations.

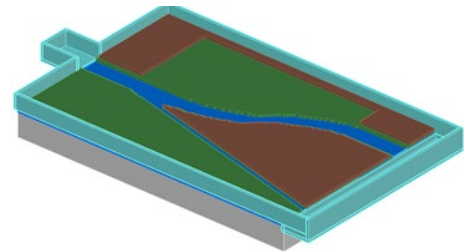
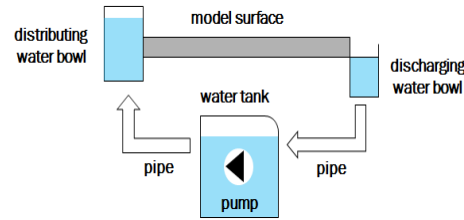
In this context, the introduction of educational tools, informational and public engagement that facilitate the understanding of the risk and will improve his perception is certainly an effective way to contribute to mitigation.

The construction of **physical models** is traditionally a very good method to facilitate the understanding of complex phenomena, which are **floods**.

Below, we propose the use of a physical model of flood scenario made with the famous LEGO bricks, to facilitate understanding and perception of **hydraulic risk**.

The bricks are a real building material, simple and above all modular, which allows a tangible representation of reality, able to effectively communicate the connection between theoretical and practical aspects of risk and suitable for immediate observation of the effects resulting from design choices, planning or behavioural (figure 1)

The model can be used to organize **Serious Games** aimed at increasing interest and active participation, as well as soliciting competition and encouraging good practices in the field of hydraulic risk.



model features

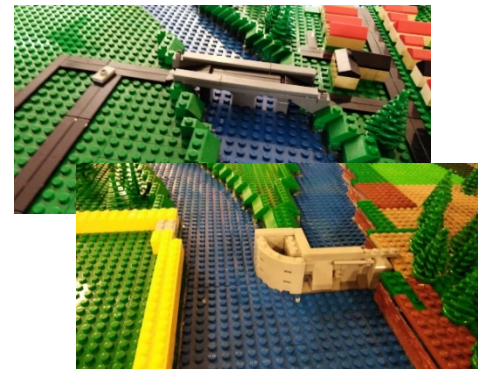
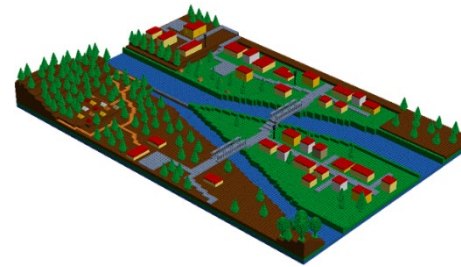
The model represents a portion of territory crossed by a watercourse and it is equipped with a water storage tank and a pumping system, for the simulation of transients and fluvial floods, and is "contained" in a tank in plexiglass for water collection (Figure 2).

The basic geometry (120 x 80 cm) is made up of three layers of wooden material, useful for representing engraved riverbeds, floodplains and adjacent areas of the existing river stretch.

The surface of the model is covered with LEGO plates, so that the geometry can be modified through the insertion of preassembled external LEGO elements such as bridges, buildings, vegetation and barriers, as well as elements dedicated to the mitigation of hydraulic risk such as expansion tanks, reins, dams, embankments and spillway.

The use of the LEGO flood scenario model is useful in several areas:

- orientation activities during meetings with students of study courses and high schools;
- demonstration events and scientific dissemination activities aimed at promoting the perception of hydraulic risk
- multidisciplinary collaboration between various thematic areas.



scenarios definition

The definition of the characteristics of the portion of territory to be represented has been defined starting from the proposals emerged from the work of exercise of the students of the Hydraulic Risk teaching a.a. 2017/2018, which, using the software LEGO Digital Designer, have made design hypotheses about the preparation of the model surface, representing an existing or fictitious urban area adjacent to the watercourse and subject to flood risk.

To counteract the flooding of these areas following the flooding of the waterway, students have prepared appropriate risk mitigation measures, planning various solutions and scenarios that are reported below.

Below are some pictures of some phases of the work and the model made.